

# SCIENCE

# And Technology Program



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Lake Mead, Nevada, serves as the primary source of drinking water for most of southern Nevada, including the cities of Las Vegas Valley. Lake Mead is also one of the most heavily used national recreation areas, with over 1 million visitors annually participating in water-related tourism and recreational activities. In 1995, Las Vegas Wash was implicated as a significant source of several classes of chemical contaminants in Lake Mead. Elevated levels of vitellogenin (a female-specific egg protein) were found in feral male carp taken from Lake Mead near Las Vegas Wash. Elevated levels of vitellogenin are an indication of endocrine disruption caused by water-borne xenobiotic chemicals. In 1997, scientists from Michigan State University performed in vitro bioassay analyses of water samples taken at various locations in Las Vegas Wash and Lake Mead. Water samples taken from Las Vegas Wash were found to have higher levels of "estrogenicity" than those in Lake Mead.

The principal goal is to determine what impact xenobiotic chemicals may have on Las Vegas Wash and Lake Mead. There is an ongoing effort to identify and quantify water-borne xenobiotic chemicals in Las Vegas Wash and Lake Mead, and to measure the effects these xenobiotic chemicals may have on the endocrine systems of feral carp. Using caged feral carp as a test species, in conjunction with chemical analyses of large volume water samples, we hope to determine the cause-effect relationship.

All three phases of the caged fish study were completed in June 1999. In this study, a total of 720 adult common carp (*Cyprinus carpio*, 2 years old) were caged at four sites in Lake Mead (Water Barge Cove, Moon Cove, Las Vegas Bay and Las Vegas Wash). The cages measured 6 by 6 by 4 feet and were suspended 6 to 8 feet below the surface. After exposure for approximately 6 weeks, the fish were removed for collection and sampling. Endpoints of interest are plasma sex steroid profiles, plasma vitellogenin, ethoxyresorufin O-deethylase (EROD) activity in the hepatopancreas, gonad and hepatopancreas histology, and in vitro steroid production by the gonads. Laboratory analyses of organs, tissues, and blood samples are still on-going.

In cooperation with local agencies, we have also collected over 30 large-volume water samples from various locations in Las Vegas Wash and Lake Mead. From these samples, we have identified and quantified over 20 pharmaceuticals, chlorinated pesticides, synthetic and natural human hormones, and chemicals from personal care products found in large volume water samples taken at various locations in Las Vegas Wash and Lake Mead.

Michigan State University, Southern Nevada Water Authority, Clark County Sanitation District, National Park Service (Lake Mead National Recreation Area), and Nevada Division of Wildlife.

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